

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
7 October 2004 (07.10.2004)

PCT

(10) International Publication Number  
**WO 2004/084622 A1**

(51) International Patent Classification: A01J 5/08, 5/04

(74) Agents: BJERKÉNS PATENTBYRÅ KB et al.; Öster-  
malmsgatan 58, S-114 50 Stockholm (SE).

(21) International Application Number:

PCT/SE2004/000424

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(22) International Filing Date: 22 March 2004 (22.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0300892-7 28 March 2003 (28.03.2003) SE

(71) Applicant (for all designated States except US):  
DELAVAL HOLDING AB [SE/SE]; P.O. Box 39,  
S-142 21 Tumba (SE).

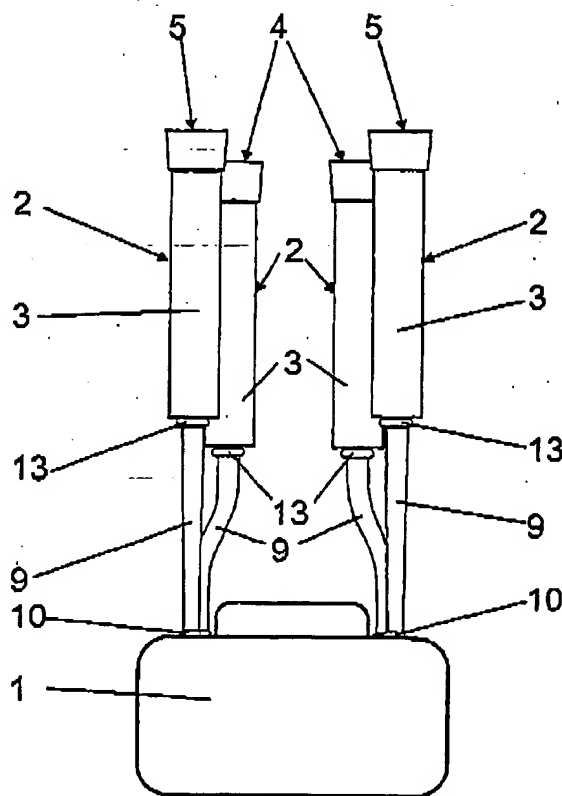
(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-  
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,  
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,

(72) Inventor; and

(75) Inventor/Applicant (for US only): KASSIBRAHIM, Jan  
[SE/SE]; Hundhamravägen 58, S-145 69 Norsborg (SE).

[Continued on next page]

(54) Title: A SET OF TEATCUPS, AND A MILKING MEMBER



(57) Abstract: The invention refers to a set of four teatcup  
liners (4, 5) and to milking member. The milking member  
includes a claw (1) and four teatcups (2) to be attached to  
a respective teat of an animal to be milked. Each teatcup  
liner has a liner portion adapted to be received in one of said  
teatcups and a conduit portion (9) adapted to extend between  
the respective teatcup and the claw. The conduit portion of  
each teatcup liner has at least one property influencing the  
operation of the teatcup liner during milking. Said property  
of a first pair of the four teatcup liners differs from said prop-  
erty of a second pair of the four teatcup liners.

WO 2004/084622 A1

**WO 2004/084622 A1**

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*

WO 2004/084622

5

A set of teatcups, and a milking member

#### BACKGROUND OF THE INVENTION AND PRIOR ART

10

The present invention refers to a set of a four of teatcup liners for a milking member including a claw and four teatcups to be attached to a respective teat of an animal to be milked, each teatcup liner having a liner portion adapted to be comprised in one of said teatcups and a conduit portion adapted to extend between the respective teatcup and the claw, wherein the conduit portion of each teatcup liner has at least one property influencing the operation of the teatcup liner during milking. The present invention also refers to a milking member including a claw, four teatcups and a set of a four of teatcup liners, each teatcup liner having a liner portion comprised in one of said teatcups and a conduit portion extending between the respective teatcup and the claw, wherein the conduit portion of each teatcup liner has at least one property influencing the operation of the teatcup liner during milking. Such a set and such a milking member is disclosed in US-A-6,058,880.

The positions of the teats of the udder of cows is in the most cases asymmetric or irregular. For instance, the distance between the two front teats is normally longer than the distance between the two rear teats. An investigation from 1983 discloses an average distance between the front teats of 150 mm, between the rear teats of 85 mm and between the rear and front teats of 100 mm. Furthermore, the front udder half is usually higher than the rear one, i.e. the two

WO 2004/084622

PCT/SE2004/000424

2

front teats are usually located at a higher position than the two rear teats. Moreover, when the udders are filled with milk the teats are relatively stiff and straggling. Therefore, the teats will be relatively immovable in relation to these positions.

This situation makes it difficult to attach teatcups configured in a conventional manner to the teats of the cow, since the teatcups do not reach the teats properly. It may therefore be difficult to attach teatcups in such a manner that they close tightly against the teat. If the teatcup liner does not close tightly against the teat, there may be a significant air inlet between the teatcup liner and the teat, which may not be controlled. This deficiency makes the milking less effective and requires a higher capacity of the vacuum pump, which in certain situations can lead to detachment of the teatcups before the milking has been terminated. There is also a restricting requirement regarding the length of the conduit portions of the teatcup liners. If the conduit portions are too long, the claw will touch the ground or the floor, at least during the end of the milking. The problems mentioned above have become worse in recent time, since the short milk conduit has become thicker and thus stiffer in order to be able to conduct an increasing milk flow. Furthermore, it has been difficult to provide a close connection between the short milk conduit and the housing of the claw due to the bending forces acting on the milk conduit. Because of this, air tends to penetrate the inner space of the housing between the short milk conduit and the inlet opening.

US-A-6,058,880 discloses a milking member including a claw, four teatcups and a set of a four of teatcup liners. Each teatcup liner has a liner portion to be comprised in one of said teatcups and a conduit portion extending between the respective teatcup and the claw. The conduit portion of each

WO 2004/084622

PCT/SE2004/000424

3

teatcup liner is substantially identical to the conduit portion of the remaining teatcup liners. This document recognises the problem caused by the irregularity of the udder. In this document it is proposed to solve this problem by providing the claw with an asymmetrical shape. The distance between the forward inlet members is longer than the distance between the rear inlet members. Moreover, the forward inlet members are provided at a higher position than the rear inlet members. Finally, this document also discloses that the forward inlet members has a larger angle of inclination to a vertical central axis than the rear inlet members.

DE-1 027 457 discloses a milking member including a claw with four inlet nipples. The two inlet nipples intended for the forward teats of the animal have a length which is shorter than the length of the inlet nipples intended for the rear teats of the animal.

US-A-631,774 discloses a milking member of a different kind. The milking member has four teatcups attached to a central member via a respective rigid milk conduit. The milk conduits extend horizontally and have a length that is adjustable by means of a telescoping mechanism.

#### SUMMARY OF THE INVENTION

The object of the present invention is to provide a solution to the problems discussed above.

This object is achieved by the set of teatcup liners initially defined, which is characterised in that said property of a first pair of the four teatcup liners differs in a predetermined manner from said property of a second pair of the four teatcup liners.

WO 2004/084622

PCT/SE2004/000424

4

By means of such a configuration of the seat of teatcup liners, it may be ensured that the teatcups in a better way than previously reach their respective teats properly. The engagement or the grip between the teatcup liners and their  
5 respective teats may be improved, reducing the risk for air leakage. Furthermore, the tensions in the conduit portion may decrease and the claw will be suspended in more natural manner beneath the animal. In addition, such a configuration may also result in an equal, downwardly directed force,  
10 acting at each teat, for all four teats. Consequently, an equal and proper milk extraction of each teat may be guaranteed.

Moreover, these advantages may be achieved by the use of a  
15 conventional claw being symmetrical with regard to the position, shape and design of the milk inlet members.

According to an embodiment of the present invention, the first pair of said teatcup liners is adapted to be attached  
20 to the rear teats of the animal and the second pair of said teatcup liners is adapted to be attached to the forward teats of the animal.

According to a further embodiment of the present invention, said property includes at least one of the length of the  
25 conduit portion, the flexibility of the conduit portion and the straightness of the conduit portion. These properties significantly influence the operation of the milking member during the milking of the animal.

30 According to a further embodiment of the present invention, said property includes the length of the conduit portion, wherein the length of the first pair differs from the length of the second pair by a predetermined distance. By such a  
35 design, the claw will hang down in natural way beneath the udder without sloping in any direction. Preferably, the

WO 2004/084622

PCT/SE2004/000424

5

predetermined distance corresponds to the length difference between the rear teats and the forward teats of the animal, wherein the length of the first pair may be shorter than the length of the second pair.

5

According to a further embodiment of the present invention said property includes the flexibility of the conduit portion, wherein the flexibility of the first pair differs from the flexibility of the second pair by a predetermined value. Such a differing flexibility is advantageous when the teats of one pair of teats are directed outwardly, since the differing flexibility permits all the teatcups to be tightly attached to the respective teat. Advantageously, the flexibility of the first pair is higher than the flexibility of the second pair.

15

According to a further embodiment of the present invention, said property includes the straightness of the conduit portion, wherein the straightness of the first pair differs from the straightness of the second pair by a predetermined value. By such a pre-formed modification of the straightness of the conduit portion, the attachment of the milking member to the teats may be adapted in a better way to the shape of the udder. Preferably, the straightness of the first pair is higher than the straightness of the second pair. Furthermore, each conduit portion of the first pair of teatcups liners may advantageously have a slightly S-like curvature in such a way that the distance between the conduit portions at the upper end in the proximity of the teatcup is shorter than at the lower end in the proximity of the claw.

20

25

30

According to a further embodiment of the present invention, each teatcup liner is one moulded piece. By moulding the teatcup liner in one single piece of material, the liner may be manufactured in an easy and convenient manner. A pre-

35

WO 2004/084622

PCT/SE2004/000424

6

formed straightness, e.g. a non-straight extension of the conduit portion, may easily be achieved by such a manufacturing method.

5 According to a further embodiment of the present invention, the set includes a member for keeping the teatcup liners together prior to the mounting of the liners in the milking member.

10 The object is also achieved by the milking member initially defined, which is characterised in that said property of a first pair of the four teatcup liners differs in a predetermined manner from said property of a second pair of the four teatcup liners. Preferred embodiments of the  
15 milking member are defined in claims 15 to 25.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described more closely  
20 by means of various embodiments thereof and with reference to the drawings attached hereto.

Fig 1 shows schematically a view of a set of teatcups liners according to a first embodiment of the  
25 present invention.

Fig 2 shows schematically a view of a set of teatcup liners according to a second embodiment of the present invention.

Fig 3 shows schematically a view of a milking member according to the present invention.  
30

Fig 4 discloses schematically a view from above of a holding member for holding the set of teatcup liners.



WO 2004/084622

PCT/SE2004/000424

7

## DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS OF THE PRESENT INVENTION

Fig 3 discloses a milking member for the milking of an animal, e.g. a cow. The milking member includes a claw 1 and four teatcups 2. Each teatcup 2 includes a teatcup shell 3 and a teatcup liner 4, 5. The claw 1 may be of any conventional type, which has a housing forming an inner space for collecting the milk from each of the teatcups 2.

10 The teatcup liners includes two pairs of teatcup liners 4, 5, a first pair of teatcup liners 4 and a second pair of teatcup liners 5. In the embodiments disclosed, the first pair of the teatcup liners 4 is adapted to be attached to the rear teats of the animal to be milked, and the second

15 pair of said teatcup liners 5 is adapted to be attached to the forward teats of the animal.

Each teatcup liner 4, 5 is moulded in one piece of a rubber material to have a pre-formed shape. Each teatcup liner 4, 5

20 has a liner portion 8 and a conduit portion 9, see Figs 1 and 2. The liner portion 8 is comprised in a respective one of said teatcups 2, and more precisely introduced in a respective one of the teatcup shells 3. When the teatcup 2 is attached to a teat of an animal to be milked, the teat is

25 introduced into the interior of the liner portion 8 of the teatcup liner 4, 5. The conduit portion 9 extends between the liner portion 8 and the claw 1. The conduit portion 9 thus has an upper end in the proximity of or adjoining the liner portion 8, and a lower end. The lower end is connected

30 to an inlet member of the claw 1.

In the embodiments disclosed, see Fig 3, the inlet member is formed by an aperture through the housing of the claw 1, wherein the lower end of the conduit portion 9 is introduced

35 into the aperture. The lower end includes two ribs 10, 11 extending around the conduit portion 9. The ribs 10, 11 are

WO 2004/084622

PCT/SE2004/000424

8

positioned at a distance from each other. When the lower end of the conduit portion 9 is introduced in the aperture of the claw 1, one of the ribs 10 will abut the upper surface surrounding the aperture and the other rib 11 will abut the lower surface surrounding the aperture. It is to be noted that the inlet members also may be formed by tubular inlet nipples extending from the claw 1, wherein each inlet nipple is introduced into the lower end of the respective conduit portion 9.

10

Furthermore, each teatcup liner 4, 5 in the proximity of the upper end of the conduit portion 9 includes two ribs 12, 13 extending around the conduit portion 9. The ribs 12, 13 are positioned at a distance from each other. When the teatcup liner 4, 5 is introduced in the respective teatcup shell 3, the conduit portion 9 will extend through an opening in the lower part of the teatcup shell 3, wherein one of the ribs 12 will abut an upper surface surrounding the opening and the other rib 13 will abut the lower surface surrounding the opening.

20

The conduit portion 9 of each teatcup liner 4, 5 has at least one property influencing the operation of the teatcup liner 4, 5 during milking in a significant manner. More precisely, three different properties are exemplified in this application. In order to achieve an improved functioning of the milking member one, two or all of these properties are varied in a predetermined manner for the different teatcup liners 4, 5 in the set of liners to cooperate with the claw 1. In particular, said property of a first pair 8 of the four teatcup liners differs in a predetermined manner from said property of a second pair of the four teatcup liners 4, 5.

35

According to a first embodiment, disclosed in Fig 1, said property refers to the length of the conduit portion 9, i.e.

WO 2004/084622

PCT/SE2004/000424

9

the length of one of said pairs differs from the length of the other of said pair by a predetermined distance 14. In particular, the length of the first pair of teatcup liners 4 to be attached to the rear teats is shorter than the length of the second pair of teatcup liners 5 to be attached to the forward teats. Since the rear teats normally are lower than the forward teats, this embodiment permits the claw 1 to hang down properly, i.e. without sloping in any direction. Preferably, the predetermined distance 14 corresponds to an average length difference between the rear teats and the forward teats of an animal, for instance a cow. For instance, the distance 14 may be at least 10 mm, at least 20 mm, at least 30 mm or at least 40 mm.

According to a second embodiment, said property refers to the flexibility of the conduit portion 9, wherein the flexibility of the first pair of teatcup liners 4 differs from the flexibility of the second pair of teatcup liners 5 by a predetermined value. In particular, the flexibility of the first pair of teatcup liners 4 to be attached to the rear teats of the animal is higher than the flexibility of the second pair of teatcup liners 5 to be attached to the forward teats of the animal.

According to a third embodiment, disclosed in Fig 2, said property refers to the straightness of the conduit portion 9, wherein the straightness of the first pair of teatcup liners 4 differs from the straightness of the second pair of teatcup liners 5 by a predetermined value. In particular, the straightness of the second pair of teatcup liners 5 to be attached to the forward teats of the animal is higher than the straightness of the first pair of teatcup liners 4 to be attached to the rear teats of the animal. As disclosed in Figs 2 and 3, each conduit portion 9 of the first pair of teatcups liners 4 has a slightly S-like curvature in such a way that the distance between the conduit portions 9 of the

WO 2004/084622

PCT/SE2004/000424

10

first pair of teatcup liners 4 at the upper end adjoining the liner portion 8 in the proximity of the teatcup shell 3 is shorter than at the lower end to be connected to the claw 1. By such a non-straight extension it is possible to compensate for the shorter mutual distance between the rear teats than between the forward teats. Moreover, by such a non-straight extension it is also possible to compensate for the shorter distance between the pair of rear teats and the pair of forward teats than mutual distance between the two forward teats.

It is to be noted that the three property differences between the first pair of teatcup liners 4 and second pair of teatcup liners 5, which have been described above, may be combined with each other in all possible combinations. Thus the first pair may be shorter and more flexible than the second pair, shorter and less straight than the second pair, more flexible and less straight than the second pair, and/or shorter, more flexible and less straight than the second pair.

The four teatcup liners 4, 5 form a set of teatcup liners to be mounted in a respective teatcup shell 3 and attached to a claw 2 of a milking member. The set of teatcup liners 4, 5 may be sold and distributed to a milk farmer as one unit. In order to facilitate the distribution and the handling on the milk farm, the teatcup liners 4, 5 of the set may be kept together in a package by a member, e.g. a holding member 20. The holding member 20 disclosed has four engagement portions 21 or openings for engaging a respective one of the teatcup liners 4, 5, see also Fig 4, and a grip portion 22.

The present invention is not limited to the embodiments disclosed and described herein, but may be varied and modified within the scope of the following claims.

WO 2004/084622

PCT/SE2004/000424

11

Claims

1. A set of a four of teatcup liners (4, 5) for a milking member including a claw (1) and four teatcups (2) to be attached to a respective teat of an animal to be milked, each teatcup liner (4, 5) having a liner portion (8) adapted to be comprised in one of said teatcups (2) and a conduit portion (5) adapted to extend between the respective teatcup and the claw, wherein the conduit portion (9) of each teatcup liner has at least one property influencing the operation of the teatcup liner during milking, characterised in that said property of the conduit portion (9) of a first pair of the four teatcup liners (4) differs in a predetermined manner from said property of a second pair of the four teatcup liners (5).

2. The set according to claim 1, characterised in that the first pair of said teatcup liners (4) is adapted to be attached to the rear teats of the animal and the second pair of said teatcup liners (5) is adapted to be attached to the forward teats of the animal.

3. The set according to any one of claims 1 and 2, characterised in that said property includes at least one of the length of the conduit portion (9), the flexibility of the conduit portion (9) and the straightness of the conduit portion (9).

4. The set according to any one of the preceding claims, characterised in that said property includes the length of the conduit portion (9), wherein the length of the first pair differs from the length of the second pair by a predetermined distance (14).

5. The set according to claim 4, characterised in that the predetermined distance (14) corresponds to the length

WO 2004/084622

PCT/SE2004/000424

12

difference between the rear teats and the forward teats of the animal.

6. The set according to claim 5, characterised in the  
5 length of the first pair is shorter than the length of the second pair.

7. The set according to any one of the preceding claims,  
10 characterised in that said property includes the flexibility of the conduit portion (9), wherein the flexibility of the first pair differs from the flexibility of the second pair by a predetermined value.

8. The set according to claim 7, characterised in that the  
15 flexibility of the first pair is higher than the flexibility of the second pair.

9. The set according to any one of the preceding claims,  
20 characterised in that said property includes the straightness of the conduit portion (9), wherein the straightness of the first pair differs from the straightness of the second pair by a predetermined value.

10. The set according to claim 9, characterised in that the  
25 straightness of the second pair is higher than the straightness of the first pair.

11. The set according to claim 10, characterised in that  
30 each conduit portion (9) of the first pair of teatcups liners (4) has a slightly S-like curvature in such a way that the distance between the conduit portions (9) at the upper end in the proximity of the teatcup (2) is shorter than at the lower end in the proximity of the claw (1).

WO 2004/084622

PCT/SE2004/000424

13

12. The set according to any one of the preceding claims, characterised in that each teatcup liner (4, 5) is one moulded piece.

5 13. The set according to any one of the preceding claims, characterised in that the set includes a member (20) for keeping the teatcup liners (4, 5) together prior to the mounting of the liners in the milking member.

10 14. A milking member including a claw (1), four teatcups (2) and a set of a four of teatcup liners (4, 5) each teatcup liner (4, 5) having a liner portion (8) comprised in one of said teatcups (2) and a conduit portion (9) extending between the respective teatcup (2) and the claw (1), wherein  
15 the conduit portion (9) of each teatcup (4, 5) has at least one property influencing the operation of the teatcup liner during milking,  
characterised in that said property of a first pair of the four teatcup liners (4) differs in a predetermined manner  
20 from said property of a second pair of the four teatcup liners (5).

15. The milking member according to claim 14, characterised in that the first pair of said teatcup liners (4) is adapted  
25 to be attached to the rear teats of the animal and the second pair of said teatcup liners (5) is adapted to be attached to the forward teats of the animal.

16. The milking member according to any one of claims 14 and 15, characterised in that said property includes at least one of the length of the conduit portion (9), the flexibility of the conduit portion (9) and the straightness of the conduit portion (9).

35 17. The milking member according to any one of claims 14 to 16, characterised in that said property includes the length

WO 2004/084622

PCT/SE2004/000424

14

of the conduit portion (9), wherein the length of the first pair differs from the length of the second pair by a predetermined distance (14).

5 18. The milking member according to claim 17, characterised in that the predetermined distance (14) corresponds to the length difference between the rear teats and the forward teats of the animal.

10 19. The milking member according to claim 18, characterised in the length of the first pair is shorter than the length of the second pair.

15 20. The milking member according to any one of claims 14 to 19, characterised in that said property includes the flexibility of the conduit portion (9), wherein the flexibility of the first pair differs from the flexibility of the second pair by a predetermined value.

20 21. The milking member according to claim 20, characterised in that the flexibility of the first pair is higher than the flexibility of the second pair.

25 22. The milking member according to any one of claims 14 to 21, characterised in that said property includes the straightness of the conduit portion (9), wherein the straightness of the first pair differs from the straightness of the second pair by a predetermined value.

30 23. The milking member according to claim 22, characterised in that the straightness of the second pair is higher than the straightness of the first pair.

35 24. The milking member according to claim 23, characterised in that each conduit portion of the first pair of teatcup liners (4) has a slightly S-like curvature in such a way



WO 2004/084622

PCT/SE2004/000424

15

that the distance between the conduit portions (9) at the upper end in the proximity of the teatcup (2) is shorter than at the lower end in the proximity of the claw (1).

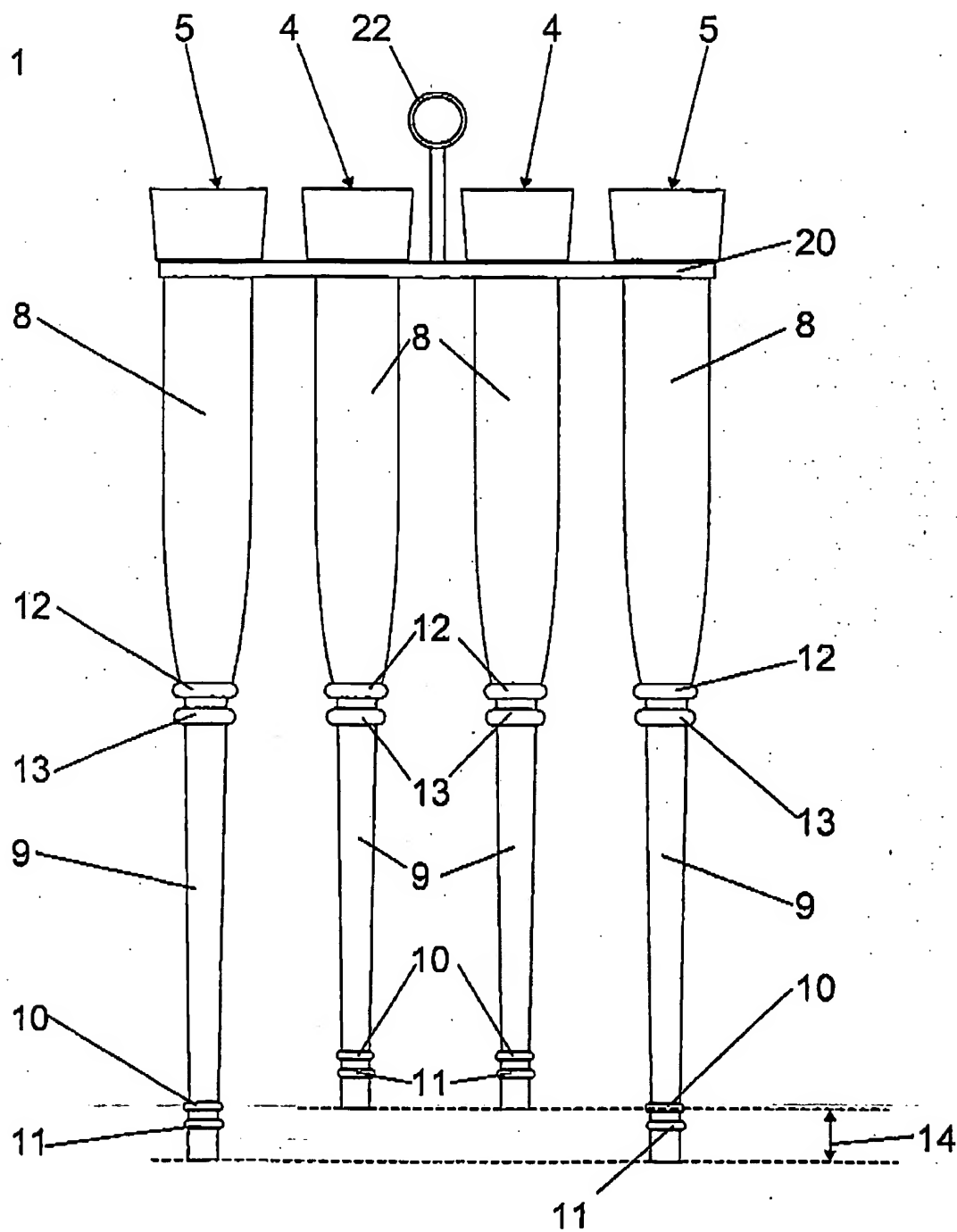
- 5 25. The milking member according to any one of claims 14 to 24, characterised in that each teatcup liner (4, 5) is one moulded piece.

WO 2004/084622

PCT/SE2004/000424

1/3

Fig 1

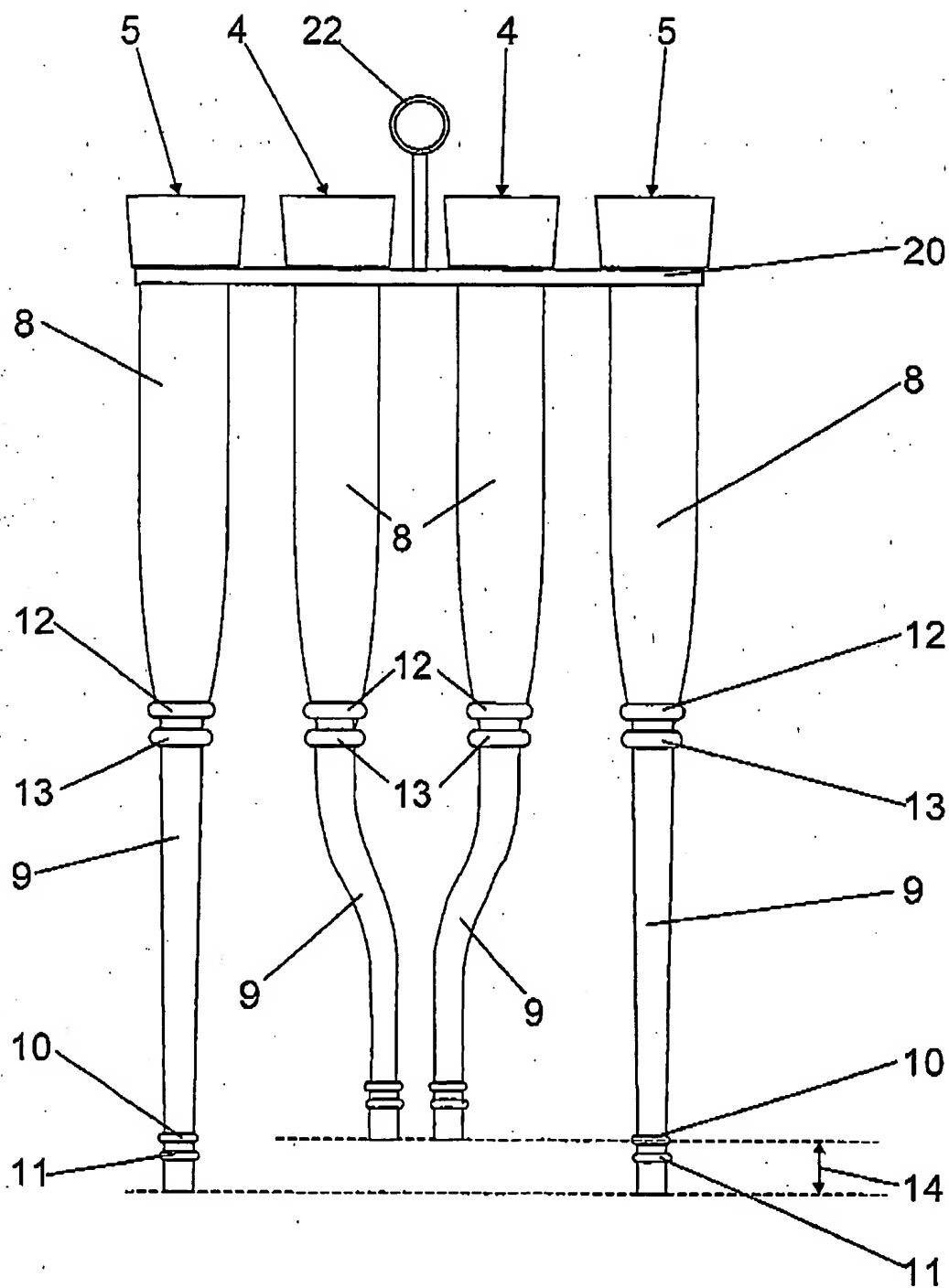


WO 2004/084622

PCT/SE2004/000424

2/3

Fig 2



WO 2004/084622

PCT/SE2004/000424

3/3

Fig 3

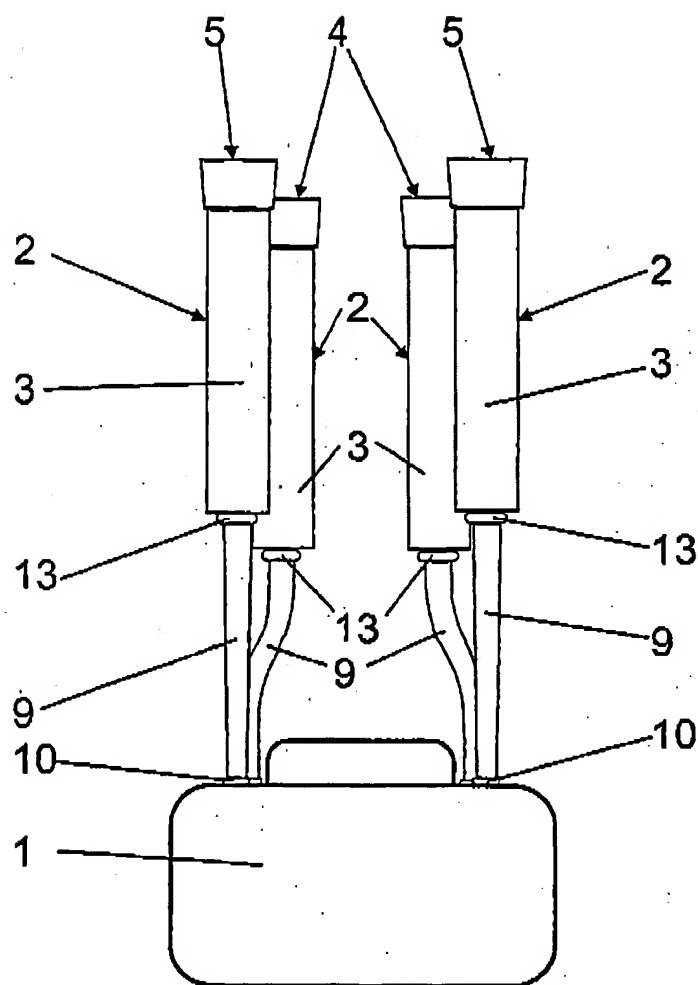
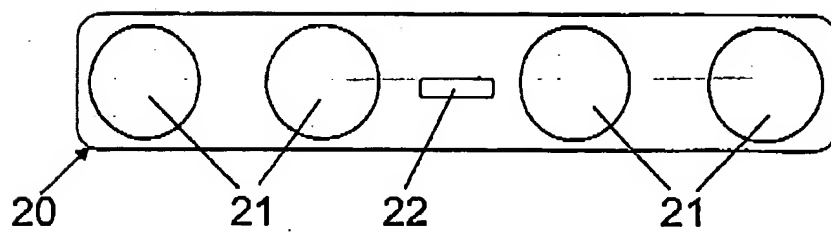


Fig 4



Claims

1. A set of a four of teatcup liners (4, 5) for a milking member including a claw (1) and four teatcups (2) to be attached to a respective teat of an animal to be milked, each teatcup liner (4, 5) having a liner portion (8) adapted to be comprised in one of said teatcups (2) and a conduit portion (5) adapted to extend between the respective teatcup and the claw, wherein the conduit portion (9) of each teatcup liner has at least one property influencing the operation of the teatcup liner during milking, characterised in that said property of the conduit portion (9) of a first pair of the four teatcup liners (4) differs in a predetermined manner from said property of a second pair of the four teatcup liners (5), and that said property includes at least one of the length of the conduit portion (9), the flexibility of the conduit portion (9) and the straightness of the conduit portion (9).
2. The set according to claim 1, characterised in that the first pair of said teatcup liners (4) is adapted to be attached to the rear teats of the animal and the second pair of said teatcup liners (5) is adapted to be attached to the forward teats of the animal.
3. The set according to any one of the preceding claims, characterised in that said property includes the length of the conduit portion (9), wherein the length of the first pair differs from the length of the second pair by a predetermined distance (14).
4. The set according to claim 3, characterised in that the predetermined distance (14) corresponds to the length difference between the rear teats and the forward teats of the animal.

5. The set according to claim 4, characterised in the length of the first pair is shorter than the length of the second pair.
- 5 6. The set according to any one of the preceding claims, characterised in that said property includes the flexibility of the conduit portion (9), wherein the flexibility of the first pair differs from the flexibility of the second pair by a predetermined value.
- 10 7. The set according to claim 6, characterised in that the flexibility of the first pair is higher than the flexibility of the second pair.
- 15 8. The set according to any one of the preceding claims, characterised in that said property includes the straightness of the conduit portion (9), wherein the straightness of the first pair differs from the straightness of the second pair by a predetermined value.
- 20 9. The set according to claim 8, characterised in that the straightness of the second pair is higher than the straightness of the first pair.
- 25 10. The set according to claim 9, characterised in that each conduit portion (9) of the first pair of teatcups liners (4) has a slightly S-like curvature in such a way that the distance between the conduit portions (9) at the upper end in the proximity of the teatcup (2) is shorter
- 30 than at the lower end in the proximity of the claw (1).
11. The set according to any one of the preceding claims, characterised in that each teatcup liner (4, 5) is one moulded piece.

12. The set according to any one of the preceding claims, characterised in that the set includes a member (20) for keeping the teatcup liners (4, 5) together prior to the mounting of the liners in the milking member.

5  
13. A milking member including a claw (1), four teatcups (2) and a set of a four of teatcup liners (4, 5) each teatcup liner (4, 5) having a liner portion (8) comprised in one of said teatcups (2) and a conduit portion (9) extending  
10 between the respective teatcup (2) and the claw (1), wherein the conduit portion (9) of each teatcup (4, 5) has at least one property influencing the operation of the teatcup liner during milking, characterised in that said property of a first pair of the four teatcup liners (4) differs in a  
15 predetermined manner from said property of a second pair of the four teatcup liners (5), and that said property includes at least one of the length of the conduit portion (9), the flexibility of the conduit portion (9) and the straightness of the conduit portion (9).

20  
14. The milking member according to claim 13, characterised in that the first pair of said teatcup liners (4) is adapted to be attached to the rear teats of the animal and the second pair of said teatcup liners (5) is adapted to be  
25 attached to the forward teats of the animal.

15. The milking member according to any one of claims 13 and 14, characterised in that said property includes the length of the conduit portion (9), wherein the length of the  
30 first pair differs from the length of the second pair by a predetermined distance (14).

16. The milking member according to claim 15, characterised in that the predetermined distance (14) corresponds to the  
35 length difference between the rear teats and the forward teats of the animal.

17. The milking member according to claim 16, characterised  
in the length of the first pair is shorter than the length  
of the second pair.

18. The milking member according to any one of claims 13 to  
17, characterised in that said property includes the  
flexibility of the conduit portion (9), wherein the  
flexibility of the first pair differs from the flexibility  
of the second pair by a predetermined value.

19. The milking member according to claim 18, characterised  
in that the flexibility of the first pair is higher than the  
flexibility of the second pair.

20. The milking member according to any one of claims 13 to  
19, characterised in that said property includes the  
straightness of the conduit portion (9), wherein the  
straightness of the first pair differs from the straightness  
of the second pair by a predetermined value.

21. The milking member according to claim 20, characterised  
in that the straightness of the second pair is higher than  
the straightness of the first pair.

22. The milking member according to claim 21, characterised  
in that each conduit portion of the first pair of teatcups  
liners (4) has a slightly S-like curvature in such a way  
that the distance between the conduit portions (9) at the  
upper end in the proximity of the teatcup (2) is shorter  
than at the lower end in the proximity of the claw (1).

23. The milking member according to any one of claims 13 to  
22, characterised in that each teatcup liner (4, 5) is one  
moulded piece.



## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 55699 PCT sb/sib	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2004/000424	International filing date (day/month/year) 22.03.2004	Priority date (day/month/year) 28.03.2003
International Patent Classification (IPC) or national classification and IPC A01J5/08 // A01J5/04		
Applicant DeLaval Holding AB et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 3 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:

- ☒ (sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:
  - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
  - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

- ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand  11.08.2004	Date of completion of this report  15.06.2005
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer  Magnus Thorén/EK Telephone No. +46 8 782 25 00

Form PCT/IPEA/409 (cover sheet) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/000424

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on a translation from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-10 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- pages \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- pages\* 11-14 \_\_\_\_\_ received by this Authority on 21.02.2005
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- pages 1-3 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/000424

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	<u>1-23</u>	YES
	Claims	_____	NO
Inventive step (IS)	Claims	<u>1-23</u>	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	<u>1-23</u>	YES
	Claims	_____	NO

## 2. Citations and explanations (Rule 70.7)

## Documents cited in the International Search Report:

D1: US2429983 A

D2: US2497299 A

D3: DE1027457 B

D4: US6058880 A

The present invention relates to a set of four teat cup liners and a milking member including such a set. The set is characterised in that a conduit portion of a first pair of liners differs from the property of a second pair. The property could inter alia be the length of the short milk tube, in order to compensate for the asymmetrical position of the teats on the udder.

As described in D1 - D4 this asymmetry is well known, but the solution to the problem in these documents is not to provide two pairs of teat cup liners. These documents solve the problem by designing the claw asymmetrically, thereby avoiding the inconvenience of having to manufacture, store and distribute liners with different length.

The present invention goes contrary to the established technology, and is therefore considered to involve an inventive step. The invention is novel and industrially applicable.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2004/000424

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A01J 5/08 // A01J 5/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2429983 A (L F BENDER ET AL), 4 November 1947 (04.11.1947), column 2, line 29 - line 55, figure 1 --	1-6,12, 14-19,25
X	US 2497299 A (S DAILY), 14 February 1950 (14.02.1950), figure 1 --	1-6,12, 14-19,25
X	DE 1027457 B (UTINA-ELEKTROWERK GMBH), 3 April 1958 (03.04.1958), column 3, line 57 - line 66, claim 1 --	1-6,12, 14-19,25

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

16 June 2004

Date of mailing of the international search report

17-06-2004

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer:

Magnus Thorén/EK  
Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2004/000424

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6058880 A (GUSTAFSSON ET AL), 9 May 2000 (09.05.2000), column 1, line 46 - column 2, line 12  --	1-6,12, 14-19,25
A	US 3079891 A (B F MILLER), 5 March 1963 (05.03.1963), column 1, line 40 - line 47; column 2, line 7 - line 12, figures 1-5  --	7-12,20-25
A	US 5131542 A (STENSTRÖM), 21 July 1992 (21.07.1992), figure 2, abstract  -- -----	13

## INTERNATIONAL SEARCH REPORT

Information on patent family members

30/04/2004

International application No.

PCT/SE 2004/000424

US	2429983	A	04/11/1947	NONE		
US	2497299	A	14/02/1950	NONE		
DE	1027457	B	03/04/1958	NONE		
US	6058880	A	09/05/2000	AU	705110 B	13/05/1999
				AU	707899 B	22/07/1999
				AU	1047597 A	22/08/1997
				AU	1681397 A	22/08/1997
				CA	2240451 A	07/08/1997
				CA	2245643 A,C	07/08/1997
				DE	69620267 D,T	21/11/2002
				DE	69712525 D,T	14/11/2002
				DK	957678 T	10/06/2002
				DK	959666 T	22/07/2002
				EP	0957678 A,B	24/11/1999
				SE	0957678 T3	
				EP	0959666 A,B	01/12/1999
				ES	2173419 T	16/10/2002
				JP	2000503851 T	04/04/2000
				JP	2000503852 T	04/04/2000
				NO	306441 B	08/11/1999
				NO	309631 B	05/03/2001
				NO	983572 A	04/08/1998
				NO	983574 A	04/08/1998
				NZ	323517 A	26/05/2000
				NZ	330742 A	28/01/2000
				SE	505005 C	09/06/1997
				SE	9600413 A	09/06/1997
				US	6006695 A	28/12/1999
				WO	9727736 A	07/08/1997
				WO	9727737 A	07/08/1997
				AU	5786598 A	07/08/1998
				CA	2277939 A	23/07/1998
				EP	0954915 A	10/11/1999
				JP	2001508973 T	03/07/2001
				SE	511389 C	20/09/1999
				SE	9700167 A	22/07/1998
				US	6137810 A	24/10/2000
				WO	9832258 A	23/07/1998
US	3079891	A	05/03/1963	NONE		
US	5131542	A	21/07/1992	AU	4224189 A	18/04/1990
				EP	0437448 A	24/07/1991
				ES	2016173 A	16/10/1990
				NZ	230795 A	29/01/1991
				PT	91833 A	30/03/1990
				SE	8803462 A	30/03/1990
				WO	9003319 A	05/04/1990